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EXAMINER	
DANIELS, MATTHEW J	

ART UNIT	PAPER NUMBER
1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/811,023	MATSUMOTO ET AL.	
	Examiner	Art Unit	
	MATTHEW J. DANIELS	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *6-16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 17-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Rejections set forth previously under this section are withdrawn in view of the persuasive arguments with respect to the King, Jr. reference.

2. **Claims 1-5 and 17-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Muramatsu (US 5,840,347) in view of Gilbert (US 4,521,172) and Murphy (US 6,352,662). **As to Claim 1**, Muramatsu teaches a process for forming a hollow FRP article by internal pressure molding, comprising:

Positioning a FRP prepreg on a periphery of an internal-pressure holding tube (flexible bag capable of sealing, 14:29-20);

Inserting a composite body including the internal-pressure holding tube into a forming die (Fig. 8);

Providing an isolation state where the composite body and forming die do not contact each other (Fig. 8, items 26 and 28)

Clamping the forming die to bring the forming die and composite body into contact with each other (14:33-34) and heating the forming die (14:33-34).

Muramatsu appears to be silent to (a) the vacuum chamber and evacuating during the isolation state, and (b) an application of pressure to an inside of the internal pressure holding tube.

However, these aspects of the invention would have been obvious over Gilbert and Murphy for the following reasons:

(a) Gilbert teaches a vacuum press having mold halves (2:38-39) in which it is possible to apply vacuum (2:56) and open the molding tool by separating the platens with the ram so as to allow volatiles and air to be removed (2:60-64) (an isolation state) before compression molding (2:19-25).

(b) Murphy teaches a process for making a hollow fiber reinforced articles not substantially different from those of Muramatsu including, providing a mandrel (50), wrapping said mandrel (50) with a bladder, wrapping said bladder with a plurality of fiber reinforced pre-preg plies (60,62) to form a wrapped assembly, placing said wrapped assembly in a mold (forming die), and pressurizing said prepreg plies by introducing a pressurized gas through said mandrel, and curing said prepreg plies to thereby form said hollow fiber reinforced article (5:21-58).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Gilbert and Murphy into that of Muramatsu for the following reasons:

(a1) Gilbert's process provides an improvement in the art by its ability to remove air, trapped gases, and volatiles from a resin through the use of a vacuum pumping process prior to molding (2:60-65). One of ordinary skill in the art would have expected the removal of air and

volatiles to reduce the number and size of voids or bubbles in the formed article. Since one practicing the method of Muramatsu uses a layered structure (Fig. 8, item 23), trapped air, gases, and volatiles would have been of a similar concern to one using the Muramatsu process. Thus, one would have found it obvious to apply the improvement of Gilbert to the Muramatsu process in order to achieve the same reduction in air, trapped gases, and volatiles, producing an expected reduction in voids, defects, and delaminations.

(a2) Gilbert suggests that the process may be used with rubber or plastics (1:5-6) and that it uses two halves of a molding tool (2:38-40). Thus, because Muramatsu provides a molding tool comprised of two halves and molds plastic, it is submitted that the Muramatsu process is within the scope of those suggested by Gilbert.

(b1) Muramatsu clearly suggests that a pressure should be applied in the inside of the prepreg (14:27-35), and Murphy provides a process and apparatus for applying the suggested pressure to the inside of the prepreg material. Therefore, Muramatsu suggests the process which Murphy provides.

(b2) Muramatsu suggests that expandable material may be used to press the tube outwardly against a mold (14:27-35) and one of ordinary skill in the art at the time of the invention would have recognized the pressurized tube of Murphy as an alternative or substitutable means for achieving the objective of Muramatsu.

As to Claim 2, Murphy teaches providing a mandrel (50), covering the mandrel (50) with a bladder and wrapping a plurality of fiber reinforced pre-preg plies (60,62) around the bladder to form a wrapped assembly (5:21-58). **As to Claim 3**, Murphy teaches heating and pressurizing said pre-preg plies by introducing a pressurized gas through said mandrel to thereby cure and

form said hollow fiber reinforced article (5:21-58). **As to Claims 4 and 5**, Murphy teaches removing said mandrel (50) after wrapping said plurality of fiber reinforced pre-preg plies (60,62) and connecting a source of pressurized gas (52) directly to said bladder (5:39-42 and Figure 3). It is submitted that said pressurized gas source (52), as shown in Figure 5, includes a mouth-piece in order to connect directly to said bladder.

As to Claim 17, Muramatsu teaches a process for forming a hollow FRP article by internal pressure molding, comprising:

Positioning a FRP prepreg on a periphery of an internal-pressure holding tube (flexible bag capable of sealing, 14:29-20);

Inserting a composite body including the internal-pressure holding tube into a forming die (Fig. 8);

Providing an isolation state where the composite body and forming die do not contact each other (Fig. 8, items 26 and 28)

Clamping the forming die to bring the forming die and composite body into contact with each other (14:33-34) and heating the forming die (14:33-34).

Muramatsu appears to be silent to (a) the vacuum chamber and evacuating during the isolation state, and (b) an application of pressure to an inside of the internal pressure holding tube.

However, these aspects of the invention would have been obvious over Gilbert and Murphy for the following reasons:

(a) Gilbert teaches a vacuum press having mold halves (2:38-39) in which it is possible to apply vacuum (2:56) and open the molding tool by separating the platens with the ram so as to

allow volatiles and air to be removed (2:60-64) (an isolation state) before compression molding (2:19-25). In using the Gilbert process with the Muramatsu hollow article, the Gilbert device would evacuate the vacuum chamber so that air having existed in a space between an outer periphery of the composite body and a periphery of the forming die would implicitly be removed (Gilbert, 2:63). Since it is Gilbert's objective to remove volatiles and air before performing a compression molding process, it is submitted that the evacuation state would be maintained during the subsequent compression molding.

(b) Murphy teaches a process for making a hollow fiber reinforced articles not substantially different from those of Muramatsu including, providing a mandrel (50), wrapping said mandrel (50) with a bladder, wrapping said bladder with a plurality of fiber reinforced pre-preg plies (60,62) to form a wrapped assembly, placing said wrapped assembly in a mold (forming die), and pressurizing said prepreg plies by introducing a pressurized gas through said mandrel, and curing said prepreg plies to thereby form said hollow fiber reinforced article (5:21-58).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Gilbert and Murphy into that of Muramatsu for the following reasons:

(a1) Gilbert's process provides an improvement in the art by its ability to remove air, trapped gases, and volatiles from a resin through the use of a vacuum pumping process prior to molding (2:60-65). One of ordinary skill in the art would have expected the removal of air and volatiles to reduce the number and size of voids or bubbles in the formed article. Since one practicing the method of Muramatsu uses a layered structure (Fig. 8, item 23), trapped air, gases,

and volatiles would have been of a similar concern to one using the Muramatsu process. Thus, one would have found it obvious to apply the improvement of Gilbert to the Muramatsu process in order to achieve the same reduction in air, trapped gases, and volatiles, producing an expected reduction in voids, defects, and delaminations.

(a2) Gilbert suggests that the process may be used with rubber or plastics (1:5-6) and that it uses two halves of a molding tool (2:38-40). Thus, because Muramatsu provides a molding tool comprised of two halves and molds plastic, it is submitted that the Muramatsu process is within the scope of those suggested by Gilbert.

(b1) Muramatsu clearly suggests that a pressure should be applied in the inside of the prepreg (14:27-35), and Murphy provides a process and apparatus for applying the suggested pressure to the inside of the prepreg material. Therefore, Muramatsu suggests the process which Murphy provides.

(b2) Muramatsu suggests that expandable material may be used to press the tube outwardly against a mold (14:27-35) and one of ordinary skill in the art at the time of the invention would have recognized the pressurized tube of Murphy as an alternative or substitutable means for achieving the objective of Muramatsu.

As to Claim 18, Murphy teaches providing a mandrel (50), covering the mandrel (50) with a bladder and wrapping a plurality of fiber reinforced pre-preg plies (60,62) around the bladder to form a wrapped assembly (5:21-58). **As to Claim 19**, Murphy teaches heating and pressurizing said pre-preg plies by introducing a pressurized gas through said mandrel to thereby cure and form said hollow fiber reinforced article (5:21-58). **As to Claims 20 and 21**, Murphy teaches removing said mandrel (50) after wrapping said plurality of fiber reinforced pre-preg

plies (60,62) and connecting a source of pressurized gas (52) directly to said bladder (5:39-42 and Figure 3). It is submitted that said pressurized gas source (52), as shown in Figure 5, includes a mouth-piece in order to connect directly to said bladder.

Response to Arguments

3. Applicant's arguments with respect to the King, Jr. reference (17 September 2008 reply) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Muramatsu, in view of Murphy and Gilbert. Applicants' arguments appear to be on the following grounds:

(a) Muphy discloses a process for wrapping a mandrel with a bladder and a plurality of pre-preg plies, placing the wrapped assembly *into contact with* a mold, and pressing the pre-preg plies outward against the mold by introducing a pressurized gas through the mandrel. Murphy discloses in Fig. 3 that the pre-preg plies contact the mold when the wrapped assembly is placed inside the mold. Neither reference teaches a process in which there is no contact between the composite body and forming die.

(b) The "isolation state" has been incorrectly interpreted. Isolation state should be interpreted to be the space between the composite body and inner surface of the lower die, factoring in the deformation of the prepreg. The process of King, Jr. moves workpieces within a vacuum chamber from a loading chamber, to a preheat chamber, to a forging press. In the claimed process, the forming die must be in the vacuum chamber. Therefore, the evacuation of the

vacuum chamber containing a forming die, composite body, and forming die in isolation state are not possible.

(c) One would not have combined Murphy with King, Jr. to teach or suggest each recitation of Claim 1. King, Jr. is found in the metal deforming classification, while the present patent application is in plastic and non-metallic shaping. The present invention solves the problem of eliminating trapped air bubbles between the composite weave and the forming die. One would not look to metal deforming to solve the problem of air bubbles being trapped between the material and the forming die.

(d) New Claim 17 recites that air having existed in a space between an outer periphery of the composite body and a periphery of the forming die is removed, and maintaining the evacuation state where air having existed in a space between the outer periphery of the composite body and the periphery of the composite body and the periphery of the forming die has been removed.

4. Response

(a) Applicants' remarks and citations to the Murphy reference have been carefully considered. However, it is submitted that col. 5, ll. 43-52 of the Murphy reference supports the Examiner's interpretation. The Murphy process inflates the bladder to force the plies against the wall of the mold. Thus, before the inflation process, the plies would not have been forced against the mold. However, Muramatsu has been relied upon on in the rejections above.

(b,c) The arguments with respect to the King, Jr. reference are persuasive.

(d) Note that the new reference to Gilbert provides a process where it is possible to open the molding tool by separating the platens or mold halves so as to allow volatiles and air to be

removed (from the molding material) without opening the doors of the vacuum chamber (Col. 2, ll. 51-66). This appears to be the same or substantially the same as the claimed process. In combination with the process of Muramatsu, where the article to be molded is shown in an isolation state (Fig. 8), the combination provides an isolation state (Muramatsu) and a vacuum chamber with molds which are separated in order to remove volatiles and air (Gilbert).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
12/20/08